

X.—On the Genus *Bathyporeia*.

By the Rev. THOMAS R. R. STEBBING, M.A.

[Plate III.]

To Lindström's original species, *Bathyporeia pilosa*, two other species, *Robertsoni* and *pelagica*, have been added by Mr. Spence Bate. Of the last, however, he had seen but a single imperfect specimen, and none but dead imperfect specimens of the other two. As I have been more fortunate, and have been able to examine perfect and living specimens of these beautiful little creatures, I have no hesitation in reducing all three forms to a single species, the original *Bathyporeia pilosa*. There can scarcely be a doubt that what has been figured as *B. pilosa* is the female, that *B. pelagica* is its male, and that *B. Robertsoni* is also the male not yet arrived at maturity.

I have taken all three forms on, or rather in, the sands at Llanfairfechan. One specimen of the male I took at low tide near Bangor, one of the female at Pwllheli; so that the species is probably to be found all round the coast of North Wales. It burrows in the sand to the depth of half an inch or a little more, and exhibits very great activity in this proceeding. When in water it is equally vivacious, darting about in all directions.

The eyes are faceted, red, and in the mature animal large and kidney-shaped, but small and round in the young. The eyes increase by addition to the number of facets—a mode of growth well known in regard to these organs in the Amphipoda, and only requiring notice here because the eyes are given as round in the figure and description of *Bathyporeia Robertsoni*.

The upper antennæ do not supply, as was supposed, a mark of distinction between the form given as *B. pelagica* and the other two, since in all alike the secondary appendage to the flagellum has one large articulus followed by a very slender small one. They are also alike in other respects, and notably in the shape of the large first joint, which stands boldly out in a line with the head, but forms a considerable angle with the two following joints, very diminutive by comparison, and attached to an excavation some little way from its compressed distal extremity.

The lower antennæ do undoubtedly differ in the three forms; and it is upon these organs that most stress has been laid in distinguishing the supposed species. The principal difference, however, is in the length of the flagellum, which is very short

in the figure of *B. pilosa*, very long in that of *B. pelagica*, and of intermediate size in that of *B. Robertsoni*. But in the order Amphipoda, as with the facets of the eyes, so with the articuli of the lash of the antennæ, an increase takes place with advancing age. This part of the animal will not, therefore, of itself suffice for the establishment of a specific distinction. Still the figure with the lash of intermediate size has a character not attributed to either of the other forms. The distal end of each articulus of the flagellum is surmounted by an ornament in the shape of an elongated horse-shoe, to which Mr. Stimpson has given the name "*calceola*," informing Messrs. Bate and Westwood that it is a character of the male sex. In their description of *Lysianassa longicornis* these authors express the opinion that the "*calceolæ*" have the power of increasing the sense of smell to a more acute degree. In describing *Bathyporeia Robertsoni* they mention the additional circumstance that in the upper antennæ each articulus bears "a short auditory cilium of an oval form." Fritz Müller mentions, in his 'Facts for Darwin' (Translation by Dallas, p. 20), that he considers these "auditory cilia" of the upper antennæ to be olfactory organs, fortifying his opinion by the fact of their stronger development in the males than in the females of certain species, as in other cases male animals are not unfrequently guided by the scent in pursuit of the females. Whether *Bathyporeia* appreciates scent and sound by the lower and upper pairs of antennæ respectively or *vice versâ*, or whether to each or either of these purposes it applies both of them or neither, is a question for nice and careful experiment. This much, however, is certain, that the "*calceolæ*," whatever their use may be, were present in those specimens which had the antennæ about as long as the animal itself, thus bringing *B. pelagica* one step nearer to *B. Robertsoni*. Between the short flagellum and the long one the difference is considerable, the former having only some seven or eight articulations, while in the latter I counted thirty-two. It should also be stated that on none of the short flagella did I observe the slipper-shaped appendages, although the specimens of this form were considerably more numerous than those of the other two. On the other hand, I took the form that has short antennæ with the young upon it, establishing the point that this is a female form, though leaving it an open question whether its mate in all respects resembles it. The young just born had a strong family likeness to their mother. There did not seem to be any long antennæ among them; nor were they to be expected.

Of the other parts of the animal one description will equally

apply to males and females, adults and juveniles. The legs of the first pair were wanting in all Mr. Spence Bate's specimens. These are very small and delicate, and, both in living and dead specimens, are cuddled up within the coxæ, as if they were too tender and precious for use. The wrist is long, and at its distal end as broad as the hand. The hand is nearly as broad as it is long, diminishing towards the finger, which is short and curved. The legs of the second pair are beautiful objects under a good lens or microscope. The wrist is larger than the hand, but of the same shape. Both are adorned with long plumose hairs; and the hand is fingerless. There is an awkwardness in speaking of hand and wrist as portions of a leg; but one is happy to escape when possible from the repetition of terms like the propodos of a gnathopodos or the ischium of a pereiopodos, and there is a convenience in using accepted and easily intelligible terms which will atone for some linguistic improprieties. We proceed, then, to notice that the hands of the third and fourth pairs of legs are long and thin, and have fingers attached to them. These would appear to be very serviceable limbs, to judge by the activity of their movements, and also by the position to which they aspire; for they are constantly thrust forward in advance of the graceful but comparatively inactive second pair of legs; and this forward position they maintain with some obstinacy, even when the animal that owns them is dead.

The three following pairs of legs, like the second pair, are destitute of fingers. They are very actively employed in shovelling back the sand when the animal is burrowing into it. In the quiescent state, and after death, the lower joints of the fifth pair are cocked back, and the lower joints of the seventh pair are thrust forward, to such an extent that the three final couples seem almost to have their order of position exactly reversed. The fifth pair has the most curious appearance, because the hand and wrist are so slight and spindle-shanked compared with the well-developed joint to which they form an appendage. In this pair the wrist is longer than the hand. In the two following these proportions are reversed. Mr. Spence Bate assigns a long slender finger to the hand of the fifth pair in *B. pilosa*. As there is no finger at all to this pair in either of his other species, so unusual a difference between species of the same genus would be remarkable; but as my Welsh specimens have none of them any vestige of this finger, it must be concluded that in Mr. Bate's imperfect specimen the hairs at the extremity of the hand had assumed, as they well might do, the appearance of a finger. It may be remarked that the drawing of the finger in the 'British Ses-

sile-eyed Crustacea' might very well represent the coalescing of long hairs or setæ.

The fourth segment of the tail has a deep transverse sinus, generally very conspicuous, but sometimes, especially after the animal is dead, concealed by the hinder portion of the preceding segment. It is no doubt from this casual concealment that the want of a sinus has been attributed to *B. pelagica* as a specific difference. The form with the long antennæ certainly possesses the sinus in question in a manner perfectly well marked. The elevated part of the segment behind the sinus is surmounted by two short setæ and also by two short spines. The hairs stand upright; the spines generally point backwards. The segment is deeply excavated below as well as above.

There is a peculiarity worth noticing in the coxa of the first pair of legs. It does not lie parallel to those which follow it, but has a sort of neck at its upper part attached to the hinder part of the segment to which it belongs, the whole of this neck-like portion being completely covered by the coxa of the succeeding segment.

The skin of the animal is white and semitransparent. Some specimens have the tail part prettily blotched with pink. Under a high power, portions of the skin exhibit markings resembling those common on fish-scales.

Other species of this beautiful little genus will be welcome when they are forthcoming; but it has probably been made clear by the foregoing details that a single species of it must content us for the present. That the male should have more fully developed antennæ than the female is perhaps rather the rule than the exception among the Amphipoda. It is a little singular that in the same hunting-ground the full-grown male should have been much more rare than the other two forms, of the female and the young; but another afternoon's research might have altered the proportion of numbers altogether, while it would be extremely peculiar, not to say improbable, that the same stretch of sand should have yielded three different species of one genus, though yielding no other Amphipod, except the very different form of *Sulcator arenarius*.

Since writing the above account I have had the opportunity of searching the sands on the south coast, which stretch for about fourteen miles from Lancing by Worthing and Goring, and on past Littlehampton. In this district also I have taken all the three forms, but those with the long antennæ very sparingly—the latter circumstance suggesting the conjecture that the adult males are less littoral in their habits than the females. My search, in company with a friend, was continued almost every

day for nearly a fortnight; and, unless where here and there weeds and stones afforded a shelter, these extensive sands yielded no other sessile-eyed Crustaceans except *Bathyporeia*, *Eurydice pulchra*, and one single small specimen of *Sulcator*. This solitary specimen we took within the first five minutes, and expected accordingly to meet with the same abundance of the species as in Wales, but, with the most eager and anxious search, during all the rest of the time could never find another in the southern locality. *Bathyporeia pilosa*, on the other hand, could have been taken in thousands. Its presence beneath the sand is betrayed by a small furrow, sometimes short and nearly straight, ending in a little pit, at others twisting and meandering about and occasionally zigzagged. The mothers with young look as if their bodies were tinted with a delicate blue; but this is due partly to a double stripe upon each ovum, the colouring of which is seen through the pellucid sides of the parent, and partly perhaps to the contents of the alimentary canal.

In the sands at Paignton, near Torquay, I have taken in close proximity to one another the sand-furrowers *Sulcator arenarius*, *Krøyeria arenaria*, *Bathyporeia pilosa*, and *Eurydice pulchra*.

EXPLANATION OF PLATE III.

- Fig. 1. *Bathyporeia pilosa*, not full-grown.
 Fig. 2. The same, adult male.
 Fig. 3. Upper antennæ.
 Fig. 4. First gnathopod.
 Fig. 5. Second gnathopod.
 Fig. 6. Third pereopod.
 Fig. 7. Fourth pereopod.
 Fig. 8. Upper portion of fifth pereopod.

XI.—*Descriptions of five new Species of Fishes obtained in the New-Zealand Seas by H.M.S.-'Challenger' Expedition, July 1874.* By JAMES HECTOR, M.D., C.M.Z.S.

Trachichthys intermedius, sp. n.

P. 16. V. 1 | 6. D. 6 | 11. A. 3 | 10. L. lat. 28.
 L. transv. 6/10. Caudal 7 | 10 | 6.

Body compressed. Length of head nearly equal to the height, and contained twice and a half in the length (without caudal, which is equal in length to the head). Pectoral extends behind the vent, being same length as caudal, and has the